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Master's Paper

UNIT ORGANIZATION OF ONE UNIT IN FOOD PRESERVATION

Submitted by

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(B.S. in Ed.)

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In partial fulfillment of requirements for

the degree of Master of Education

1948

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CHAPTER I

THE PURPOSE OF THIS UNIT

This paper is concerned with the developing of one unit in home economics at the eighth-grade level.

It is an effort to apply the principles set forth in Fundamentals of Secondary-School Teaching[1] and the course in the unit method at Boston University.

The pupils and the school.-- This unit was built for one group of eighteen girls taking cooking in grade eight. Fifteen of the girls are of French extraction, two are of Portuguese extraction and one is of English extraction. The majority of the girls leave school when they are sixteen years of age. They go into the needle trades to work and most of them become wives and homemakers before they are twenty years old.

All of the fathers and four of the mothers of the eighteen girls are employed in the various mills and factories in the city. The major aim of the parents and pupils is that they learn as much as possible about sewing and cooking so that they can assist with the work at home while attending school and then get a job and marry after they

1/ Roy O. Billett, Fundamentals of Secondary-School Teaching, Houghton Mifflin Company, Boston, 1940.

reach sixteen and leave school.

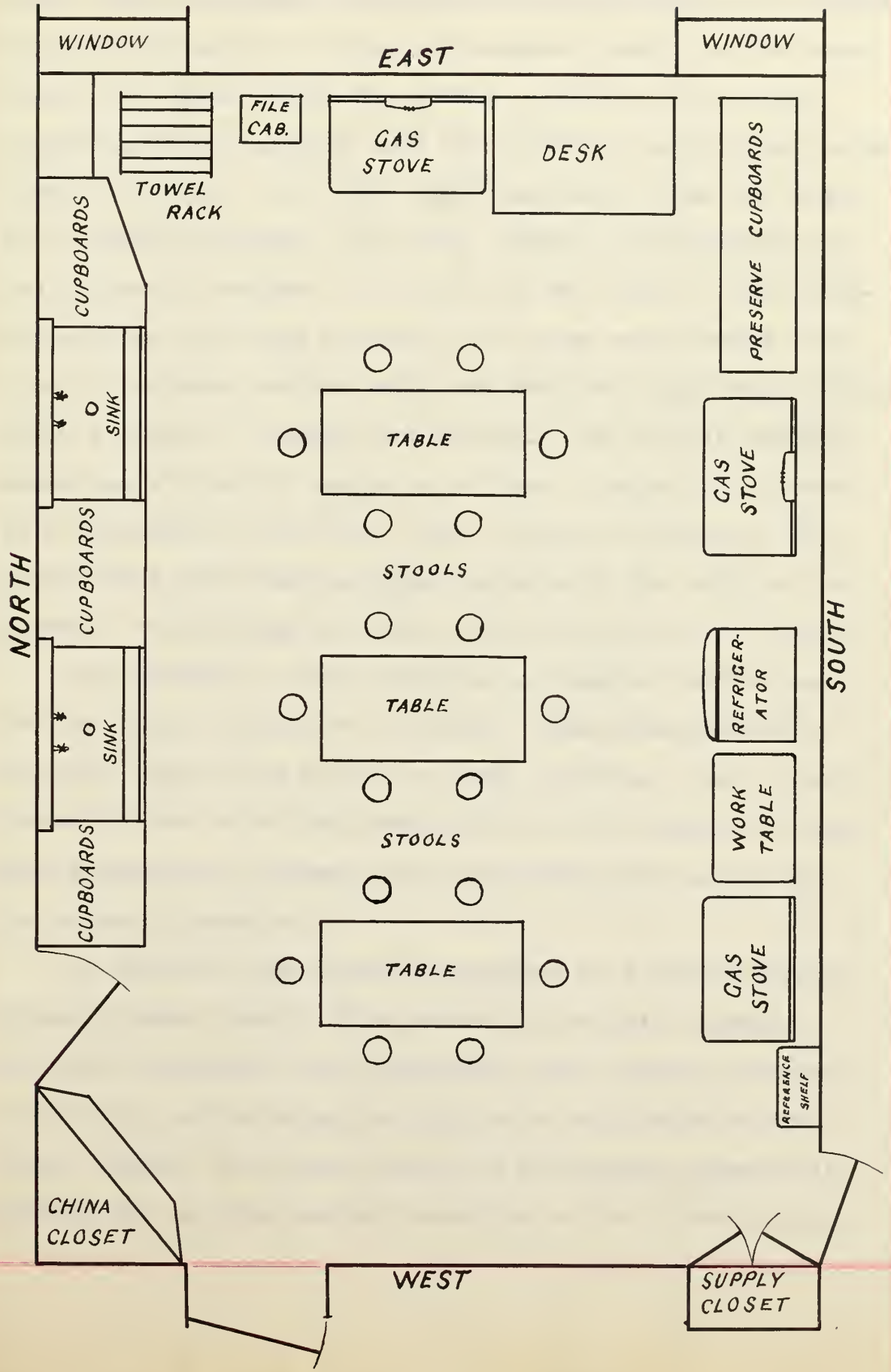
The ages of this group range from fourteen years and two months to fifteen years and eleven months. The range of their intelligence quotients as based on the Otis Self-Administering Test is from sixty-seven to one hundred and nine.

Of the eighteen girls in the class, eight girls work after school. These girls work in various fields: one girl works in a hospital; one girl works in a pharmacy; two girls work in bakeries; two girls take care of children; and two girls do housework in homes of the well-to-do families in the city.

Our school is housed in an old, renovated school building. It formerly was a continuation school. Four years ago a two-year course in homemaking replaced the old program. Girls are admitted to the school when they have completed the sixth grade. Girls who have completed the sixth grade are placed in one group, those who have completed the seventh grade are placed in another group, those who have completed the eighth grade are placed in a third group, and those who have finished the ninth grade are placed in a fourth group. The girls must attend school five days a week until they reach sixteen years of age. However, the girls are encouraged to remain for the two years when they will receive a homemaking certificate at graduation exercises.

The equipment in the cooking room is of the best. We

FLOOR PLAN OF MY KITCHEN.



have three gas stoves, an electric refrigerator and two sinks. There are three work tables and eighteen stools in the room. There is a china closet for dishes, a closet for storing supplies, and a cupboard used for storing preserves and large staple products. Cupboards have been built under the sinks for cooking equipment. The room, itself, is attractive for the following reasons: It is on the east side of the building and has two large windows; the floors are covered with inlaid linoleum; and the walls are painted light cream which helps to make it cheerful and bright. The room is oblong, measuring 13 feet 10 inches by 25 feet 6 inches, and there is a blackboard on the west side. There is available wall space where charts and colored pictures of the unit may be placed. The drawing will show the floor plan of the room.

The periods are fifty minutes in length. Each class has two double periods for canning. Food preservation is actually done by the pupils in these periods. Food is purchased by the school and used later by the classes in their meal preparation lessons and in preparing the lunches for the school cafeteria.

In addition each class is assigned to a single period called "related foods". This period is devoted to tests, allowing the pupils to do research on the optional related activities, and allowing the pupils to tell their results to the class. It is very useful to the teacher because it enables her to give special attention to the slower pupils

in the group. The teaching of the unit covered a period of three weeks.

The test.-- The items which constitute the test were made out when the unit was planned. These questions were grouped relative to the items in the delimitation.

Answers were to be placed on the left hand side of the paper.

The scoring of this test is objective. A key was made from an unused test for scoring the responses to each item. Thus the teacher has an exact matching test for correction and incorrect items may be conveniently marked.

At the beginning of the unit mimeographed copies of the test were given to the pupils. The pupils were informed that this test would not count as a part of their mark. One class period of fifty minutes was used in giving the test. At the end of the unit the same test was given and the mark obtained was included as a part of their mark on the entire unit.

Preparing my classroom to teach by the unit method.-- Because my room had been newly furnished there were very few changes to be made.

I had a filing cabinet put in my room. In this I kept the various pamphlets the pupils needed to use when doing the optional related activities. The study and activity guides and extra copies of the test were kept in my desk drawer.

I placed a file box on top of this cabinet. The optional related activities were written on individual cards and placed in this box. There were two copies of each optional related activity..

Posters were put around the room so that the pupils could see in pictures what they were actually doing in the classroom..

Room was made on one of the shelves for the reference books the pupils used in their core and optional related activities..

CHAPTER II

FOOD PRESERVATION

General statement of the unit.---In doing food preservation at home it is necessary to follow certain procedures if you wish to have a good product. This depends on the type of food you choose, the time of the year, and the method you are going to follow.

Delimitation of the unit.--

A. It is important that you measure accurately.

1. Necessary equipment is usually found in an average kitchen.

2. For accurate measurement use the standard size measuring cup, tablespoon, and teaspoon, and be sure measurements are level.

3. Measure dry materials first and liquids last to avoid soiling unnecessary dishes.

4. To measure correctly use the following as a guide:

a. A cupful of dry material: Fill the cup with a spoon, and level with the back of a case knife.

b. A cupful of liquids: Fill the cup brimming full.

c. A fraction of a cupful: Fill to the proper

marking on the cup.

d. A spoonful: Fill the spoon heaping full, and level with the back of a case knife.

e. A half spoonful: Divide a spoonful in halves lengthwise.

f. A quarter spoonful: Divide the half spoonful crosswise.

g. An eighth of a spoonful: Divide the quarter spoonful diagonally as in cutting a pie.

h. One-third spoonful: Divide a spoonful crosswise into three equal parts.

i. A speck: Cover the tip of a paring knife with a few grains.

j. It is permissible to use the sets of spoons having one quarter, one half, and one whole spoonful in the set. It is also permissible to use the graduated sets of measuring cups.

B. The spoiling of food is caused by the presence of tiny plants commonly called germs.

1. Microbes differ in size, shape, and color.

2. They are classified as yeast, molds, and bacteria.

3. They need warmth, moisture, and a suitable soil in order to grow.

C. The growth of these organisms can be retarded or stopped by one of the following methods:

1. By heating and sealing in air-tight jars;

2. By removing moisture as in drying;

3. By freezing at 12 degrees Fahrenheit;

4. By adding spices, vinegar, salt, sugar, or smoke.

D. Equipment necessary is usually found in the average kitchen.

1. Pans for washing, rinsing, and cooking;

2. Kettle for blanching;

3. Knives for preparation use;

4. A processing kettle or pressure cooker.

E. Choosing jars.

1. They should be thoroughly washed; there is no need to sterilize them.

2. They should be tested by careful inspection for cracks, bubbles, and nicks on sealing surface.

3. If lightning-type jar is used, be sure the clamps are properly fitted.

a. When the cover is placed on the jar without a rubber, the top clamp should go into position with a slight "click" and the side clamp should go down with a "click".

b. If this does not happen, you must remove the top clamp and adjust it.

c. Grasp the ends of the clamp with the two hands.

d. Press the two thumbs in the center of the clamp and make a slight dent in the top of the clamp.

e. Replace the clamp on the jar and test it.

4.. Mason-type and other screw-top jars are perfectly satisfactory to use..

F.. Choosing rubbers.

1.. Rubbers should be new..

2.. Rubbers should be tested by stretching them about four inches. If they return to normal size, they are probably good..

G. There are three common methods of canning in the home..

1.. There are the open kettle method, the cold pack method, and the hot pack method..

a.. In the open kettle method we do the following::

1.. The food is first sterilized in a kettle, poured into clean jars and sealed air-tight..

2. These jars do not have to be processed..

3.. Jelly, marmalade, and pickled products are preserved by this method..

b.. In the cold pack method we do the following::

1.. The food is placed in clean jars..

2.. A suitable liquid--brine or syrup-- is added to fill the jars..

3.. The rubbers are placed on the jars and the covers are adjusted..

4.. The clamps are now adjusted.. When canning meat or fish, the side clamp will not be pressed down until the processing time has

been completed. For canning all other foods the jars may be completely sealed.

5.. The jars are then placed on a rack in the hot water bath or pressure cooker and processed the required length of time..

6.. This method is used for preserving fruits and vegetables..

c.. In the hot pack method we do the following:

1.. The food is cooked in an open kettle for about five minutes.

2.. This food is poured into clean jars and sealed..

3.. The jars are then processed the required length of time..

4. This method is a combination of the open kettle and the cold pack methods..

5.. This method is used for making tomato juice,, tomato ketchup,, chili sauce, and garden special..

H.. Appearance and spoilage in poorly preserved foods..

1.. Canned foods will discolor if they are:

a.. Overprocessed;,

b.. Allowed to stand in the air after blanching;,

c.. Packed so that air pockets are left in the top..

2.. A crushed looking pack is caused when

a.. The food is overblanched;,

b.. The jars are packed too tightly..

3. A jar that looks only partly filled will result if:
   a. The food is not blanched enough;
   b. The jar is processed too long;
   c. The syrup used with fruits is too heavy.
4. Insufficient liquid in the jar is caused when:
   a. The water in the processing kettle boils too rapidly;
   b. The water in the processing kettle is below the top of the jars;
   c. The steam pressure is not constant;
   d. The steam is let off in the pressure cooker before the needle returns to zero.

I. Causes of canned food spoiling are:
   1. Not processing jars immediately after filling. This causes "flat sour".
   2. Using bruised or decayed fruit.
   3. Using defective jars, covers, or rubbers.
   4. Not processing the jar the required length of time.
   5. Packing the jars too tightly when canning corn, peas, and shell beans. When the food is processed it swells and does not allow the heat to get to the center of the jar. This causes "flat sour".

J. We can tell when a jar of food has spoiled by one of the following methods:
   1. The liquid in the jar is cloudy;
   2. The canned food is spongy and discolored;
   3. When the bail is opened the cover is not sealed;

4. There are bubbles of air in the jar.

K. Food preservation is a means of providing a fresh food supply for everyone throughout the year.

L. It is economical to purchase foods for home canning when they are plentiful and cheap.

M. Other ways man may keep food for future use are:

1. Building a storage cellar;
2. Building a storage pit in the back yard;
3. Installing a home freezer;
4. Putting the food in commercially owned freezer lockers.

N. Commercially canned foods may be bought in seven different size cans.

1. The number 1/4 flat can contains 4 3/4 ounces. It contains approximately 1/2 cup of food. It is used for various meat spreads such as: ham, tongue, and liver.
2. The number 1/2 flat can contains 7 3/4 ounces to 8 1/2 ounces. It contains approximately 1 cup of food. It is used principally for salmon.
3. The number 1 tall can contains 12 to 16 ounces. It contains approximately 2 cups of food. It is used for salmon, fruit cocktail, and fruits for salad.
4. The number 2 can contains 1 pound 2 ounces to 1 pound 8 ounces. It contains approximately 2 1/2 cups. It is used primarily for vegetables, fruits, and juices.

5. The number 2 1/2 can contains 1 pound 10 ounces to 2 pounds 3 ounces. It contains approximately 3 1/2 cups. It is used mainly for fruits, spinach, tomatoes, sauerkraut, beets, and pumpkin.
6. The number 5 can (often referred to as a number 3 cylinder) contains 3 pounds 9 ounces. It contains approximately 6 cups. It is used for juices.
7. The number 10 can contains 6 pounds to 8 pounds. It contains approximately 13 cups. It is used for vegetables and fruits. It is commonly called restaurant or institutional size and is not ordinarily available in retail stores.

O. What to eat can best be answered by the following recommendations with reference to the Basic Seven Food Groups. These food groups and the number of servings the average person should have daily are as follows: 1/

1. Group One: Green and yellow vegetables (canned, raw, or frozen). One or more servings daily.
2. Group Two: Oranges, tomatoes, grapefruit, cabbage, or salad greens. One or more servings daily.
3. Group Three: Potatoes and other vegetables and fruits (canned, raw, cooked, frozen, or dried). Two or more servings daily.
4. Group Four: Milk (fluid, evaporated, dried) and milk products. The growing child and adolescent should

1/ Kerr Glass Manufacturing Company, 12 Short Lessons in Home Canning, Kerr Glass Manufacturing Corporation, Sand Springs, Oklahoma.

have 3/4 to 1 quart, adults should have one pint or more.

5. Group Five: Meat, poultry, fish, or eggs. At least 3 or 4 servings of eggs per week, and one serving of meat, poultry, or fish each day.
6. Group Six: Bread, flour, and cereals. Three or more servings daily.
7. Group Seven: Butter and fortified margarine. Use these for seasoning and spreads.

P. Meals can be made interesting by adding some preserved foods to the menu.

Probable incidental and indirect learning products:--

1. The ability to wisely select commercially canned foods.
2. An appreciation of the superiority of today's methods of preservation in comparison to the methods used in the past.

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(For teacher's use only)

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The Unit Assignment

Introductory activities.--

1. The objective test built for the unit was given to the pupils in order to learn what the pupils knew about food preservation. The results obtained aided the writer to plan in detail her approach to the unit.
2. A class demonstration was held on the use of different types of jars for canning. Examples of the following types of jars were shown to the pupils: the bail-type jar, the Mason and Kerr type jars, and the empty coffee and commercial jars. Holes were punched in the covers of the latter jars to make them usable as bands. Special lids were purchased to use with these bands to make the jars usable for canning.
3. A class demonstration was held on the different types of canning equipment that may be used when doing canning at home. The pupils were shown the wash boiler and rack which holds eight jars. They were also shown that a large kettle may also be used. They were told that the kettle should be tall enough to hold the jar plus an inch of water over the top of the jar. A cake cooler was fitted into the bottom of the kettle to serve as a rack.
4. A class discussion was based on impromptu reports of food preservation. The pupils were encouraged to tell if they helped their mothers with food preservation, the types of equipment they used at home, the types of jars they used

and the process they followed when canning the food.

Core activities.--

Problem 1. a. Why would you preserve foods at home?

b. When would you say it would be advisable to can foods in the home?

c. What foods would you suggest should be canned at home?

Problem 2. Why are accurate measurements necessary when canning at home?

a. How would you measure salt for a pint jar of food that you are preserving?

b. What would happen if you did not measure the vinegar correctly when making cucumber pickles?

Problem 3. What causes food to spoil?

a. Name some harmful organisms that cause food to spoil.

b. What conditions do these organisms need to become active?

c. Are all organisms harmful?

d. Name some that are not harmful and tell why?

Problem 4. What equipment is necessary to preserve foods?

a. How would you use a hot water bath?

b. How would you use a pressure cooker?

Problem 5. What kind of jars and rubbers would you use?

a. How would you test a jar and rubber to see if

it is good?

b. Show how you would tighten the top bail on a jar?

c. Is it necessary to sterilize jars as long as they are clean? If so, why, and if not, why not?

Problem 6. How would you choose the food for canning?

a. As for shape

b. As for ripeness

c. As for size

Problem 7. When do we use the cold pack method of canning?

a. Is it necessary to always blanch the food?

b. What does blanching do to the food?

c. Why do you cold dip the food after blanching?

d. What should you remember when packing food into a jar?

e. When should you start to put the liquid into the jar?

f. Is it permissible to completely seal the jar before processing?

g. When must you remember not to seal the jar completely?

h. The two common methods for preserving foods are the hot water bath and the pressure cooker.

1. What equipment is necessary when using the hot water bath?

2. Why is it necessary to have a rack under

the jars?

3. What should be the temperature of the water in the processing kettle?

4. When should you start to count the time for processing?

5. What kind of water should you add when the water in the processing kettle boils away? Why?

6. When would you close the pet-cock valve on a pressure cooker?

7. What would happen if you closed it too soon?

8. What would happen if the pressure was not even for the whole cooking time?

Problem 8. When do we use the hot pack method of canning?

a. Is it necessary to process jars packed by this method?

b. How would you protect them from spoiling?

Problem 9. When do we use the open kettle method of canning?

a. How would you use this method?

b. What type foods do we preserve by this method?

Problem 10. Choose a jar of good preserved food and a jar of poorly preserved food.

a. How does the liquid compare in both jars?

b. How does the fruit compare in both jars?

c. Open the jar of poorly preserved food.

1. See if the food has spoiled.

2. If it has, what would you do about the jar and cover?

3. What steps might have been improperly followed in the canning process?

Problem 11. Information on the labels of commercially canned foods.

a. Choose three cans of food from our supply closet.

1. What do you notice about the information on the three labels?

2. If you were buying canned food in a store, which can would you buy?

Problem 12. What foods are necessary every day?

a. How will it be possible to get all these foods in your meals in the winter?

b. Plan three meals for your family for a day.

1. Include the necessary foods.

2. Show how you would serve some canned foods in the meals.

When you have finished this work you may want to do some extra work on food preservation.

A number of suggestions are on file on our reference shelf. Choose a topic and be ready to present it to the class during the first week of October.

Optional related activities.--

1. Two girls may work on this topic. (1:3-5; 5:19-20; 6:6-7)
   A. Tell the story of food preservation from primitive man to the present.
      1. What did man do about his food supply thousands of years ago?
      2. What happened to the food supply when the population increased?
      3. What did the people do in order to get enough food?
      4. How did these people keep their meat and fish from spoiling?
      5. What did these people do about the wild animals and gardens?
      6. What were some of the ways they preserved this food for the winter?
      7. What happened after the beginning of the nineteenth century to improve the methods of food preservation?
2. Gather some pictures of a storage cellar and a storage pit. (1:13-15)
   A. Relate to the class how to make one of these.
   B. Tell the class what foods can be stored in these places.
3. Read the story of spices. (1:43-53)
   A. Who was it that first told Europe about the abundance

and uses for spice as seen in China?

B. How else were spices used other than for cooking?

C. Do we use spices as preservatives or as seasonings?

D. What kind of a climate do spices need in which to grow?

E. Where are the largest spice-producing regions in the world?

F. From what part of the plant do the following spices come: ginger, cinnamon, clove, allspice, vanilla, pepper, and nutmeg?

4. Make a chart showing the sizes of commercially canned foods and the amount of contents in each.

5. Prepare some canned food at home and compare it with some that was done in class.

6. Prepare a recipe book on food preservation. (1:3-65; 6:8-20; 9:658-667)

A. Include the various ways of preserving food.

B. Include the different methods of canning.

C. Include pictures to illustrate the above.

7. Plan the meals for your family for a week. (6:22)

A. Show what foods you will use fresh and what foods you will use canned.

8. Make a scrap book showing pictures of foods that may be canned. Tell by what method these foods may be canned.

9. Prepare a map showing where canning factories are located.

10. Make a chart of the Basic Seven Food Groups and make a list of which foods may be canned. (5:34-45; 6:5)

11. What laws have been passed by the government to protect commercially canned foods? (5:29-33)

    A. When were these laws passed?

    B. Why were these laws passed?

12. Make some drawings to show how you would measure parts of a spoon and cup of dry and liquid ingredients. (10:4-5; 11:11-12)

13. Make a map showing the chief transportation routes in our own country.

14. List the steps you would follow when preparing food to be placed in a home freezer.

List of Readings

(For pupils' use)

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Evaluative Material

Objective Type Test

Part I

Directions: Three answers are given for each of the following statements. You are to choose the best answer and place a check mark before it, as shown in the sample.

Sample - Jar rubbers may be used
1. Twice
2. Three times
3. ✓ Once

1. When canning
   1. It is not important to measure accurately.
   2. It is important to measure accurately.
   3. It makes no difference how you measure.

2. Food is spoiled by
   1. Sun
   2. Air
   3. Bacteria

3. The most sanitary method of preserving food is to cook it in
   1. An open kettle
   2. A jar with a top
   3. A jar without a top

4. In order to grow, organisms need
   1. Heat, moisture, air
   2. Cold
   3. Water

5. You can check the pressure in a pressure cooker by the
   1. Gauge
   2. Pet-cock
   3. Safety valve

6. When using a pressure cooker
   1. The food cooks longer
   2. The food will cook at a lower temperature
   3. The food will cook at a higher temperature

7. Before jars are used for preserving food, they should be
   1. Washed in warm soapy water and then boiled
   2. Washed and soaked in hot water
   3. Thoroughly washed

8. A jar with a chip or crack
   1. Should not be used
   2. May be used if the cover is tight
   3. May be used for cold pack canning

9. Jar rubbers may be used
   1. Until they are worn out
   2. Only once
   3. As often as you wish

10. Blanching
   1. Shrinks the food
   2. Thoroughly cooks the food
   3. Helps food retain its flavor

11. When preserving foods
   1. It is necessary to blanch all foods
   2. It is not necessary to blanch some foods
   3. It is not necessary to blanch any of the food

12. In using the cold pack method
   1. The jars must be processed
   2. The jars do not have to be processed
   3. The jars may or may not be processed

13. In using a hot water bath
   1. You may put the jars on the bottom of the kettle
   2. You should have a rack under the jars in the kettle
   3. The jars will touch the bottom of the kettle

14. We cold-dip the food after blanching
   1. To shrink the food
   2. To make the food easier to handle
   3. To destroy the bacteria

15. We start to count the processing time in the hot water bath
   1. As soon as we put the jar in the water
   2. Five minutes after we put the jar in the water
   3. As soon as the water starts to boil

16. A crushed-looking pack is caused when
   1. The jars are not packed enough
   2. The food is not blanched
   3. The jar is packed too tightly

17. Canned foods will discolor
   1. If they are not processed enough
   2. If they are overprocessed
   3. If they are not blanched

18. Insufficient liquid in the jar results
    1. When the water in the processing kettle boils too rapidly
    2. When the water is over the top of the jars
    3. When the water in the processing kettle does not boil fast enough

19. Corn and beans should not be packed tightly in the jar because
    1. They shrink
    2. They swell
    3. They do not change shape

20. Canned foods will spoil
    1. When the food is processed too long
    2. When the jars are not packed tightly
    3. When you used cracked jars and covers

21. We may tell that a jar of food has spoiled
    1. When the liquid in the jar is cloudy
    2. When the jar is only partly filled with liquid
    3. When the bail is tight

22. Canned food should be used
    1. When the fresh product is out of season
    2. Throughout the year
    3. When the fresh product is plentiful

23. When canning you would choose food that
    1. Is over ripe
    2. Has a decayed spot on it
    3. Is slightly underripe

24. It is not necessary to can these foods
    1. Carrots and cherries
    2. Carrots and apples
    3. Carrots and potatoes

25. For good health
    1. We should eat some of the seven foods every day.
    2. We should have milk and vegetables every day
    3. We should eat fruits every day

Part II

Directions: Some of the following statements are true and some are not true. Put the letter T before the statement if you think it is true, or N if you think it is not true.

Sample - T Blanching will shrink food.
N You should always blanch food.

___1. It is not important how you measure when canning.
___2. There are two cups in one pint.
___3. There are two teaspoons to one tablespoon.
___4. Measurements should always be level.
___5. Food will spoil if left in the air.
___6. All organisms are harmful.
___7. Sugar is added to dried foods.
___8. Corn may be dried for storing.
___9. The safety valve of the pressure cooker should be cleaned regularly.
__10. It is not necessary to have the pressure even for the whole period.
__11. A pressure cooker cooks below the boiling point.
__12. Before jars are used they should be thoroughly washed.
__13. A jar with a crack may be used.
__14. It is not necessary to sterilize jars.
__15. Jar rubbers do not have to be tested before using them.
__16. There are four methods of canning.
__17. You need not have a rack in the bottom of the canner.
__18. The jar should be filled to the top with liquid.
__19. You should have the water in the canner at least one inch above the top of the jar.
__20. The water should be cold when you start to can.
__21. You should choose food that is slightly underripe.
__22. You should pack jars very tightly.
__23. The jar should be full of liquid at the end of the processing period.
__24. Canned foods should be cooled before storing.
__25. Tomatoes are blanched to cook them.
__26. Salt is added to canned foods as a preservative.
__27. Blanching loosens the skins of some fruits and vegetables.
__28. Foods cooked in the hot pack method should be processed.
__29. Foods preserved by the cold pack method should be precooked.
__30. Heat must go through the center of the jar to completely sterilize it.
__31. It is not necessary to make a crosscut through the center of a jar of greens.

__32. You should not add salt and water until the jar is filled with vegetables.
__33. Carrots should be peeled and not scraped.
__34. The ideal storage space is cool and dry.
__35. You should remove the air bubbles from the jar.
__36. Foods will not be crushed if they are overblanched.
__37. The jar will be only partly filled if the food is not blanched enough.
__38. Corn and beans swell when cooking.
__39. You may cut the time short in processing.
__40. It is good to use wilted vegetables for canning.
__41. We may get "flat sour" when a jar is packed too tightly.
__42. Processing does not have to be done immediately after packing the jar.
__43. Money can be saved by doing canning at home.
__44. You should can food throughout the year.
__45. Turnips do not have to be canned.
__46. One can store vegetables out of doors.
__47. You should eat some of the seven foods every day.
__48. Food was not preserved for future use by the natives.
__49. Foods are preserved in drying by removing moisture.
__50. It is important to heat canned foods before serving them.

Part III

Directions: Match the items in Section A with the items in Section B. Write the number of the item in Section A in the space provided before the item in Section B.

Section A

1. hot pack method
2. air, warmth, moisture
3. the food is overblanched
4. open kettle method
5. cloudy
6. bacteria, yeasts, molds
7. a recipe
8. cold pack method
9. during the winter
10. thoroughly wash them
11. ripe food
12. not to the top
13. is best to use that kind
14. when the fresh food is plentiful
15. once only
16. by removing bacteria
17. is best to avoid that brand
18. not constant
19. adjust the top bail
20. storage cellar
21. decayed food
22. the cover is cracked
23. is difficult to destroy some kinds of bacteria
24. sterilize them
25. well fed
26. constant

Section B

1.___Because of the formation of spores it
2.___In order to grow, organisms need
3.___Foods spoil because of
4.___Food is dried
5.___Before jars are used you should
6.___When using old jars it may be necessary to
7.___To get best results rubbers should be used
8.___Food is cooked, packed in jars and then processed in the
9.___Raw food is packed into the jar and then the jar is processed in the
10.___Food is cooked, packed in jars and not processed in the
11.___A crushed looking pack is caused when
12.___Insufficient liquid in the jar is caused when the pressure is
13.___A jar of food will spoil when
14.___Canned food will spoil if you used
15.___A jar of food is spoiled if the liquid in the jar is
16.___The time of the year to can foods is
17.___You store root vegetables in a
18.___If the label on canned goods shows artificial coloring or preservative, it
19.___If you eat some of the basic foods every day you will be
20.___A list of ingredients and rules for combining and cooking them is

CHAPTER III

ESTIMATING PUPIL GROWTH

Growth indicated.-- It is possible to see at a glance the initial score and final score of each pupil on the test. (Table 1). Every pupil gained on the second test. The points gained are shown in column (4) of Table 1.

The chronological age and the intelligence quotient of each pupil tested is shown in columns (2) and (3) of Table 2.

The range of the scores before teaching the unit and after teaching the unit are clearly shown in Table 3.

A comparison of the total scores before the study of the unit shows that learning took place by the raising of the mean from 50 before the study of the unit to 70 after the study of the unit.

Careful observation of the following graph clearly shows the comparison of the scores on the pre-test and the final test. It is well to note that the lowest score on the final test was twenty points higher than the lowest score on the pre-test. The highest score on the final test was twenty-two points higher than the highest score on the pre-test.

The relative growth of the class is clearly indicated in Table 4 and Table 5. In these tables it is well to note the mean, standard deviation, and actual distribution of pupil growth as obtained from the pre-test and final test.

Table 1. Initial Score, Final Score, and Points Gained by Each Pupil on Test.

Pupil	Initial Score	Final Score	Points Gained
(1)	(2)	(3)	(4)
1	61	91	30
2	49	89	40
3	69	89	20
4	64	84	20
5	64	85	21
6	45	87	42
7	61	85	24
8	54	86	32
9	60	79	19
10	52	75	23
11	47	72	25
12	33	65	32
13	47	74	27
14	34	71	37
15	43	63	20
16	39	63	24
17	39	53	14
18	41	68	27

Table 2. Age, Intelligence Quotient, Initial Score on Test, Final Score on Test for Each Pupil.

Pupil	Age	Intelligence Quotient a/	Initial Score on Test	Final Score on Test
(1)	(2)	(3)	(4)	(5)
1	14-2	109	61	91
2	14-4	108	49	89
3	15-2	104	69	89
4	15-3	104	64	84
5	15-4	103	64	85
6	14-11	99	45	87
7	15-1	94	61	85
8	15-4	93	54	86
9	14-9	92	60	79
10	15-2	90	52	75
11	15-5	87	47	72
12	15-10	85	33	65
13	14-11	81	47	74
14	15-8	80	34	71
15	14-8	76	43	63
16	14-3	76	39	63
17	15-10	72	39	53
18	14-11	67	41	68

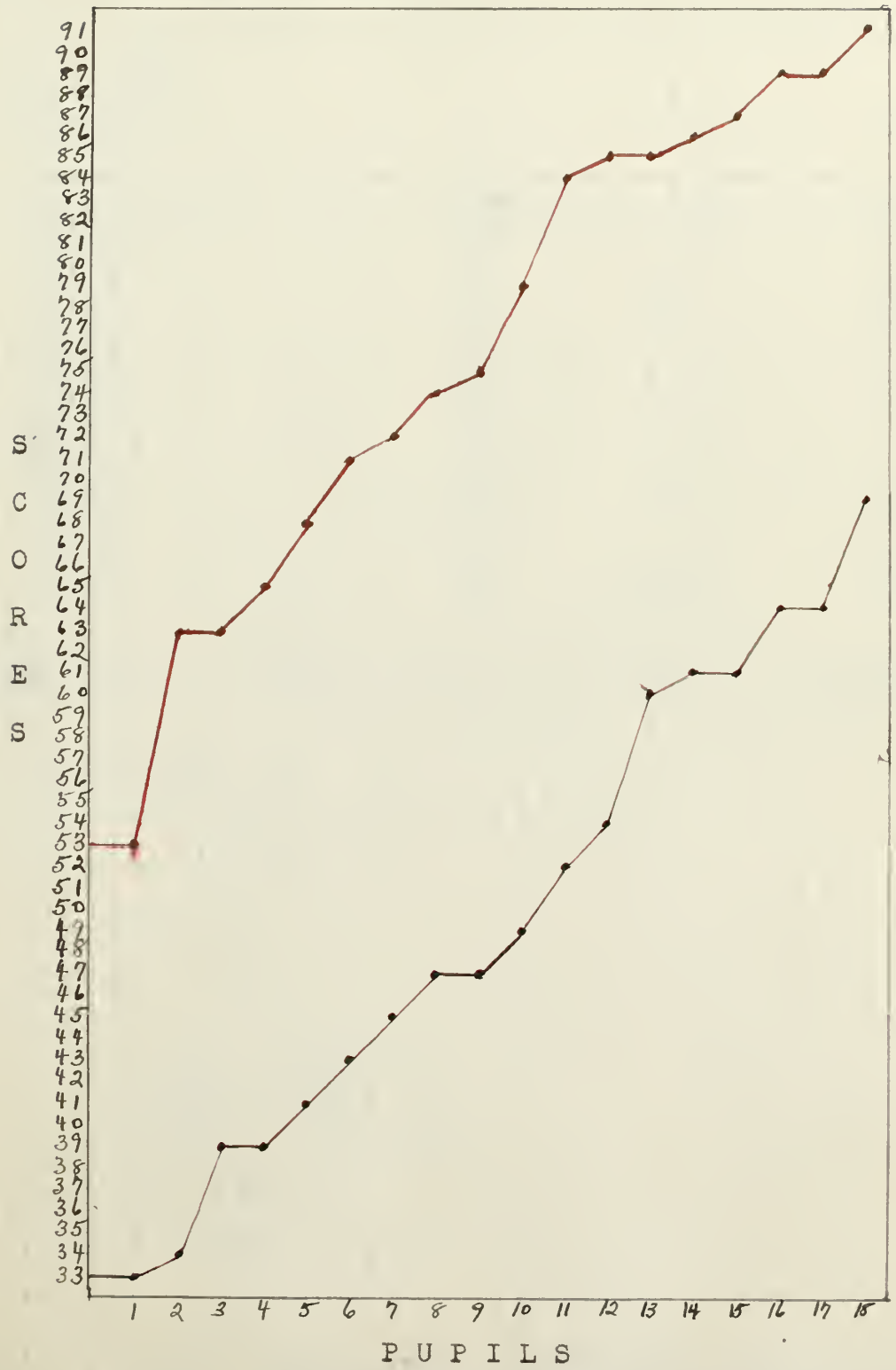
a/ These figures are based on The Otis Self-Administering Test.

Table 3. Range of Scores Before and After Teaching the Unit.

Before Teaching Unit (1)	After Teaching Unit (2)
33	53
34	63
39	63
39	65
41	68
43	71
45	72
47	74
47	75
49	79
52	84
54	85
60	85
61	86
61	87
64	89
64	89
69	91
Mean - 50	Mean - 76

GRAPH COMPARING RANGE of SCORES MADE BY 18 PUPILS

ON PRE-TEST and FINAL TEST



Before Teaching Unit

After Teaching Unit

Table 4. Illustrating The Calculation of the Mean and Standard Deviation on the Pre-test. a/

Final Scores in class intervals of three	F	D	FD	FD^2
(1)	(2)	(3)	(4)	(5)
69-71	1	+7	+7	49
66-68	0	+6	0	0
63-65	2	+5	+10	50
60-62	3	+4	+12	48
57-59	0	+3	0	0
54-56	1	+2	+2	4
51-53	1	+1	+1	1
48-50	1	0	0	
45-47	3	-1	-3	3
42-44	1	-2	-2	4
39-41	3	-3	-9	27
36-38	0	-4	0	0
33-35	2	-5	-10	50
30-32	0	-6	0	0
Totals----	18		+8	236

Assumed mean 49

$m = 49 + (+8 \div 18) \times 3$

$m = 49 + (+0.44) \times 3$

$m = 49 + 1.32$

$m = 50.32$ or 50

$$S.D. = \sqrt{\frac{236}{18} - \left(\frac{+8}{18}\right)^2} \times 3$$

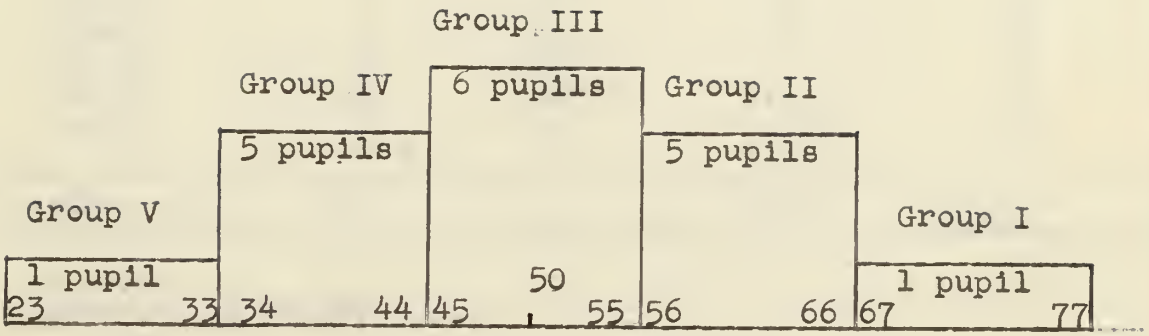
$S.D. = \sqrt{13,11 - 0.19} \times 3$

$S.D. = \sqrt{12.92} \times 3$

$S.D. = 3.595 \times 3$

$S.D. = 10.79$ or 11

a/Roy O. Billett, Fundamentals of Secondary-School Teaching, Houghton Mifflin Company, Boston, 1940. pp. 631-633



Relative Growth Scale

Table 5. Illustrating The Calculation of the Mean and Standard Deviation on the Final Test. a/

Final Scores in class intervals of three	F	D	FD	FD^2
(1)	(2)	(3)	(4)	(5)
90-92	1	+5	+5	25
87-89	3	+4	+12	48
84-86	4	+3	+12	36
81-83	0	+2	0	0
78-80	1	+1	+1	1
75-77	1	0	0	
72-74	2	-1	-2	2
69-71	1	-2	-2	4
66-68	1	-3	-3	9
63-65	3	-4	-12	48
60-62	0	-5	0	0
57-59	0	-6	0	0
54-56	0	-7	0	0
51-53	1	-8	-8	64
Totals----	18		+3	237

Assumed mean 76

$m = 76 + (+3 \div 18) \times 3$

$m = 76 + (-0.166) \times 3$

$m = 76 + 0.498$

$m = 76.49$ or 76.5

$$S.D. = \sqrt{\frac{237}{18} - \left(\frac{+3}{18}\right)^2} \times 3$$

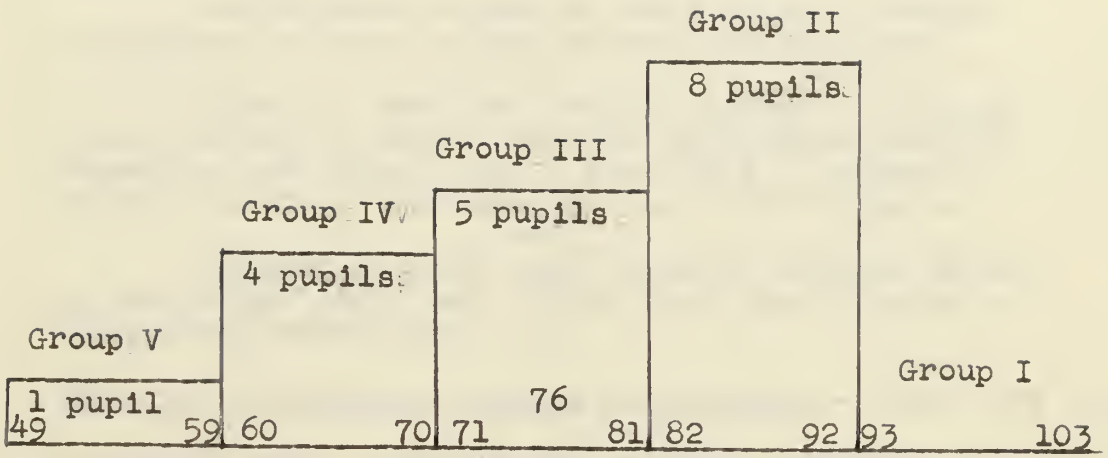
$$S.D. = \sqrt{13.17 - 0.03} \times 3$$

$$S.D. = \sqrt{13.04} \times 3$$

$$S.D. = 3.61 \times 3$$

$$S.D. = 10.83 \text{ or } 11$$

a/ Roy O. Billett, Fundamentals of Secondary-School Teaching, Houghton Mifflin Company, Boston, 1940. pp. 631-633



Relative Growth Scale

Reactions of the pupils to the unit.-- At the conclusion of the unit, the pupils were asked to answer a few questions about this new way of doing the work. Approximately seven-eights of the pupils were very enthusiastic about the unit. They grasped every opportunity to do work on their copy of the general study and activity guide.

Some of their comments follow:

> I liked being taught by this method because something interesting was always taking place.
>
> ---
>
> I liked to have the reports given in related foods because I didn't have to do a great deal of research work myself but I feel that I learned a great deal from listening to the other reports.
>
> ---
>
> I learned a great deal from the reports given by the other girls and I know that they learned a great deal from mine. ---

Reports on optional related activities.-- Some very interesting reports were given on the optional related activities.

One pupil brought in a sample of jelly that she made at home.

Some excellent charts on the Basic Seven Food Groups were made by the pupils. These charts show what foods are necessary in the daily diet. Two copies of the chart may be found in the Appendix.

A copy of "The Story of Spices" may be found in the Appendix. This story tells the history of spices, their uses, and the countries in which the various spices may be found.

A copy of "The Pure Food Law" may be found in the Appendix. This article tells when the food law was passed, the reason for passing the law, and the facts that must be stated on the

label.

A copy of "The History of Food Preservation" may be found in the Appendix. This article tells the story of primitive man and how he procured his food. The story tells how he preserved his food for the winter. The article goes on to tell how preservation was improved by many discoveries during the following centuries. It also tells about food preservation at the present time.

Comments of the teacher.-- This has been an attempt to build and teach a unit on food preservation. Some changes will probably have to be made from year to year. The writer hopes to compare the results every year for the next five years to see the growth made by the pupils over that period of time.

APPENDIXES

THE BASIC 7
Group One
Green And Yellow Vegeta bles
Group Two
Oranges, Tomatoes, Grape-fruit
Group Three
Potatoes And Other Vegetables And Fruits
Group Four
Milk And Milk Pro-ducts
Group Five
Meat Poultry, Fish Or Eggs
Group Six
Bread Flour And Cere-als
Group Seven
Butter And Fortified Margari-ne
U.S. Needs
US STRONG
EAT THE
Basic
7

WHEEL OF GOOD EATING

APPENDIX C.

Maureen Sicard September 25, 1947

The Story of Spices

A. Marco Polo was the first man who told about the abundance of spices in China.

B. Spices were also used for medicine as well as for cooking.

C. You can use spices as preservatives or as seasonings.

D. A dry climate is needed for the growth of spices.

E. The East and West Indies are the largest spice producing regions in the world.

F. Ginger comes from the root of a plant of the East and West Indies.

Cinnamon comes from the bark of an evergreen tree.

Allspice is a sun dried fruit of a tree native to the West Indies, Mexico, and Jamaica.

Cloves comes from the buds of an evergreen tree.

Vanilla is made of a fermented and dry pod of an orchid family.

Pepper comes from a climbing plant and its fruit.

Nutmeg is the whole kernel of the seed of a tall evergreen tree native to the Banda Islands.

APPENDIX D.

Dorothy Aguiar September 25, 1947

Pure Food Law

1. When coloring is used that fact must be stated on the label.
2. A label must accurately describe the contents.
3. Canning factories must be clean and food must not overripen or spoil before it is canned.
4. The Secretary of Agriculture is authorized to describe a fair standard for the quality and condition of the food canned and the amount in the can.
5. Each label must state whether the food in the can is of standard or below standard.
6. This will help us to know whether what we select is above or below the standard of excellence set by the government.
7. The food law was passed in 1906.
8. The law was passed to protect us against harmful ingredients in canned goods.

APPENDIX E.

Claire Collard September 25, 1947

History of Food Preservation

In the early days primitive men roamed the wild forest hunting game and picking wild seeds and berries because they were food gatherers in those days and not food producers. He was master of animals and learned to kill them for food. No one knows how these simple folks felled t hose powerful beast, for their only weapons were stones and clubs. He'd drive bears from their den, catch wild horses, hurl rocks at fish, and grub for green things too.

He would eat till he was satisfied and throw the rest away because he did not know how to preserve food. During the winter when there was nothing to be had he would go cold and hungry and his children would die from want for only the strongest survived.

Then he discovered fire to cook his food and warm his den.

Life became easier. As the years went on he tamed the herds in order not to follow them.

They learned that freezing foods would preserve them. No one knows how they came upon finding salt but they also learned if you put salt between layers of dried meat it would preserve them also.

Then in time they learned to smoke meat by slicing thin slices and putting them on the roof under the fire. And in time they learned to plant vegetables, etc.

In the nineteenth century they found the cause of food spoilage. Until canning was perfected there was no satisfactory way of keeping food for a long period of time. For thousands of years men were trying many different ways. Some of them were so simple they were part of a folklore of all primitive people. Others more complex were the products of fairly advanced civilization. But none proved satisfactory in all climates. Each was a step further in the development of modern food preservation.

In the middle of the eighteenth century Peter Kalm, a Swedish scolar, came to our shores. He had been sent here by the swedish crown. His purpose was to study plant life to see if it would grow on Swedish soil. He collected plants and seeds and wrote records of what he saw.

Among many things which Kalm described were the ways that the animals stored their food. The method by which they stored their food is called "Storage". Primitive man probably learned from animals how to store his own nuts and seeds in a hole among the rocks in his cave. At any rate man has kept his food this way since very ancient times.

Our own methods of storing food today differ greatly from those of our remote ancestors.

We use more elaborate containers now. You may have seen a row of tall cylindrical elevators in our midwestern states. These are for storing grain--wheat, rye, and barley to be ground later into flour.

As the years went on people were still trying out experiments to solve the problem of canning. Harmful chemicals as preservatives were once used widely both in commercial and home canning. The substances which were used are artificial preservatives: benzoate of soda, borax, formaldehyde, and salicylic acid. All of these taken in sufficient quantities may be harmful although neither the home canner nor the commercial food packer rarely used enough actually to be injurious.

After a time, however, these substances became unpopular, and harmless chemicals came into use such as: salt, vinegar, sugar, wood smoke, spices. No one knows their origin as preservatives.

They are so common with our daily diet nowadays that people think of them as foodstuffs. Actually these substances are as truly chemicals as the artificial preservatives just mentioned.

APPENDIX F.

Key to Test on Food Preservation

Part I

1. (2)	14. (2)		
2. (3)	15. (3)		
3. (2)	16. (3)		
4. (1)	17. (2)		
5. (1)	18. (1)		
6. (3)	19. (2)		
7. (3)	20. (3)		
8. (1)	21. (1)		
9. (2)	22. (1)		
10. (1)	23. (3)		
11. (2)	24. (3)		
12. (1)	25. (1)		
13. (2)			

Part II

1. N	14. T	27. T	40. N
2. T	15. N	28. N	41. T
3. N	16. N	29. N	42. N
4. T	17. N	30. T	43. T
5. T	18. T	31. N	44. N
6. N	19. T	32. N	45. T
7. N	20. N	33. N	46. T
8. T	21. T	34. T	47. T
9. T	22. N	35. T	48. N
10. N	23. T	36. N	49. T
11. N	24. T	37. T	50. T
12. T	25. N	38. T	
13. N	26. N	39. N	

Part III

1. (23)	6. (19)	11. (3)	16. (14)
2. (2)	7. (15)	12. (18)	17. (20)
3. (6)	8. (1)	13. (22)	18. (17)
4. (16)	9. (8)	14. (21)	19. (25)
5. (10)	10. (4)	15. (5)	20. (7)

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